



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/085,313	02/28/2002	Michael Gaynes	END920010053US1	8607
7590 06/08/2004			EXAMINER	
Driggs, Lucas, Brubaker and Hogg			HARAN, JOHN T	
8522 East Avenue			ART UNIT	
Mentor, OH 44060			PAPER NUMBER	
			1733	
DATE MAILED: 06/08/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/085,313	GAYNES ET AL.	
	Examiner	Art Unit	
	John T. Haran	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 12-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 19-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed on 5/11/04.

Election/Restrictions

2. Applicant's election of Group I, claims 1-11 and 19-21 is acknowledged.

Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2 and 3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2 and 3 refer to an abrasive member. It appears that the abrasive member is considered the same as the abrasive material as claim 1 but it is not entirely clear that such is the case. It is suggested to utilize the same terminology throughout the claims. Also claim 2 should be amended to say "said abrasive material/member" since it appears it is the same one referred to in claim 1.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Koch et al (U.S. Patent 6,309,494).

The admitted prior art teaches it is known to bond a heat sink to a dielectric material of an electronic package with a quantity of silicone thereon with an adhesive, but that the adherence is weak (Specification, page 2, line 24 to page 3, line 16; See also Background of the Invention section of parent application 09/757,185). It is also noted that the preamble of claim 1 takes this as being known. The admitted prior art is silent towards roughening the surface of the dielectric material prior to applying the adhesive.

It is notoriously well known and conventional to roughen a surface in order to create a larger surface area and thereby increase adhesion with an adhesive, as shown for example in Koch et al. Koch et al teaches attaching an electronic package encapsulated in a dielectric material to the innerliner of a tire wherein the innerliner of the tire and the surface of the encapsulated electronic package are roughened with a buffing tool such as tungsten carbide (abrasive material) in order to increase adhesion with an adhesive (See Figures 2-3; Column 4, lines 28-42; Column 7, lines 22-24). One skilled in the art would have readily appreciated that roughening a surface to enhance adhesion with an abrasive material is notoriously well known and conventional in the bonding art in general and additionally is known when bonding an electronic package encapsulated in a dielectric material to another surface. Regarding claims 1 and 19, it would have been obvious to one of ordinary skill in the art at the time the invention was

Art Unit: 1733

made to roughen the dielectric material encapsulating the electronic package with an abrasive material in the method of the admitted prior art in order to increase adhesion as suggested in Koch et al to create an electronic package with a roughened overmold surface attached to a heat sink via adhesive.

Regarding claim 2, Koch et al teach roughening with a buffing tool (an abrasive member for rubbing to roughen) and it would have been obvious to use such in the method of the admitted prior art, as modified above.

Regarding claim 3, one skilled in the art would have readily appreciated that one of ordinary skill in the art would have been able to determine the necessary amount of strokes to adequately roughen the surface and it would have been obvious to use the necessary amount of strokes.

Regarding claims 4-6 one skilled in the art would have readily appreciated that the adhesive would need to cure in order to effectively adhere the heat sink to the electronic package and that the curing duration and temperature would depend upon the adhesive material utilized. It would have been obvious to allow the adhesive to cure under ordinary conditions for the adhesive.

Regarding claim 20, the admitted prior art teaches the overmold is a polymer material.

7. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Koch et al (U.S. Patent 6,309,494) as applied to claims 1-6 and 19-20 above, and further in view of Roth (U.S. Patent 5,938,854).

The admitted prior art and Koch et al are silent towards exposing the surface of the dielectric material to a plasma prior to applying the adhesive. However, it is notoriously old and well known that polymer surfaces should be clean and free of contamination for maximizing bond strength of a polymer surface to an adhesive, as shown for example in Roth. Roth teaches oxygen plasma cleaning treatment for removing contaminants from polymer surfaces to improve bond strength with adhesives (col. 1, lines 15-30, col. 2, lines 45-48, col. 4, lines 21-41, col. 5, lines 37-54, col. 8, lines 19-25, lines 56-64). It would have been obvious to one of ordinary skill in the art at the time the invention was made to clean the surface of the dielectric material with a plasma in the method of the admitted prior art, as modified above, in order to enhance adhesion and increase the surfaces adhesive properties.

Regarding claims 8-10, one skilled in the art would have readily appreciated that the pressure, flow rate, and power of the plasma are within the purview of one skilled in the art and depend upon a variety of factors including the material to be cleaned. One skilled in the art would have had the skill to determine the necessary parameters of the plasma exposure and it would have been obvious to use such parameters.

8. Claims 11 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Koch et al (U.S. Patent 6,309,494) as applied to claims 1-6 and 19-20 above, and further in view of Lin et al (U.S. Patent 5,450,283).

The admitted prior art is silent towards the electronic package being a ball grid array and toward electrically coupled to a host substrate prior to bonding a heat sink to the dielectric material.

Regarding claim 11, it is well known and conventional to have an electronic component electrically coupled to a host substrate prior to encapsulating it with an overmold of dielectric material, as shown for example in Lin (See Figures 1-3). One skilled in the art would have readily appreciated that the heat sink can't be bonded to the package until the component is encapsulated. It would have been obvious to one of ordinary skill in the art at the time the invention was made to electrically couple the electronic component to a host substrate prior to bonding the heat sink in the method of the admitted prior art, as modified above.

Regarding claim 21, it is well known and conventional in the art to have plastic ball grid arrays encapsulated in an overmold, as shown for example in Lin et al (See Figure 6). One skilled in the art would have readily appreciated attaching a heat sink to any known encapsulated electronic package. It would have been obvious for the electronic package of the admitted prior art, as modified above, to be a plastic ball grid array package.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

Art Unit: 1733

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 7-10 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 6,206,997 in view of Koch et al (U.S. Patent 6,309,494).

It is first noted that the present application is a continuation in part (CIP) of a divisional application of U.S. Patent 6,206,997, however if the claims of the present application had been originally presented in U.S. Patent 6,206,997 they would not have been restricted from claim 1 of U.S. Patent 6,206,997.

Claims 1-5 of U.S. Patent 6,206,997 collectively teach applying a heat sink to a dielectric polymeric overmold, with silicone residue on it, encapsulating an electronic component with an adherent wherein the overmold is expose to plasma prior to applying the adherent under the specified conditions, but is silent towards roughening the overmold.

It is notoriously well known and conventional to roughen a surface in order to create a larger surface area and thereby increase adhesion with an adhesive, as shown for example in Koch et al. Koch et al teaches attaching an electronic package encapsulated in a dielectric material to the innerliner of a tire wherein the innerliner of the tire and the surface of the encapsulated electronic package are roughened with a buffing tool such as tungsten carbide (abrasive material) in order to increase adhesion

Art Unit: 1733

with an adhesive (See Figures 2-3; Column 4, lines 28-42; Column 7, lines 22-24). One skilled in the art would have readily appreciated that roughening a surface with an abrasive material to enhance adhesion is notoriously well known and conventional in the bonding art in general and additionally is known when bonding an electronic package encapsulated in a dielectric material to another surface. It would have been obvious to one of ordinary skill in the art at the time the invention was made to roughen the dielectric material encapsulating the electronic package with an abrasive material in the method of U.S. Patent 6,206,997 in order to increase adhesion as suggested in Koch et al.

Response to Arguments

11. Applicant's arguments filed on 5/11/04 have been fully considered but they are not persuasive.

Regarding claims 1 and 19, Koch teaches roughening the surface of an encapsulated electronic component and teaches that roughening can be accomplished with an abrasive material such as a buffing tool. While Koch is silent towards whether the encapsulating polymer contains silicone oil or other residues, roughening with an abrasive material is notoriously well known and conventional in the bonding art for improving adhesion. There is ample motivation and expectation of success to roughen the surface of the dielectric material with an abrasive material in the method of the admitted prior art.

Regarding claims 7-10, Applicant argues that the plasma is used to convert the silicone oil and that Roth teaches using plasma only for cleaning and not for conversion

Art Unit: 1733

of silicone oil. However, it is noted that the claims only require applying plasma, there is no mention of the purpose of the plasma and Roth provides sufficient motivation to apply plasma to clean the surface and therefore meets the limitations of the claims.

Regarding claims 11 and 21, Lin is cited as an example that it is well known and conventional to have an electrical component electrically coupled to a host substrate and then encapsulate the electrical component and provides sufficient motivation to do so in the method of the prior art and it is clear that the electrical couple occurs prior to bonding with the heat sink.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

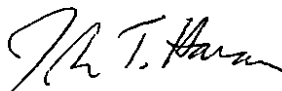
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1733


13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(571) 272-1217**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John T. Haran



JEFF H. AFTERGUT
PRIMARY EXAMINER
GROUP 1300